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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No. : 10/065,436 Confirmation No: 8668  
Applicant : Frederick L. Travelute III  
Filed : 10/17/2002  
T.C./A.U. : 1771  
Examiner : Jennifer A. Boyd  
Docket No. : 3000.166  
Customer No. : 021176  
For : HIGHLY ABSORBENT POLYESTER FIBERS

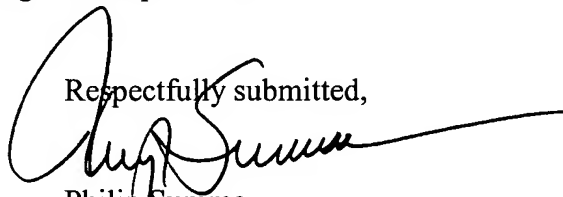
May 31, 2005

Mail Stop Appeal Brief - Patents  
Commissioner for Patents  
Post Office Box 1450  
Alexandria, VA 22313-1450

**TRANSMITTAL OF APPEAL BRIEF**  
**(PATENT APPLICATION – 37 C.F.R. § 1.192)**

1. Transmitted herewith, in triplicate, is the APPEAL BRIEF in this application, with respect to the Notice of Appeal filed on March 31, 2005.
2. This application is filed on behalf of Wellman, Inc., a large entity.
3. Pursuant to 37 C.F.R. § 41.20(b)(2), the fee for filing the Appeal Brief is \$500. Any additional fee or refund may be charged to Deposit Account 50-0332.

Respectfully submitted,

  
Philip Summa  
Reg. No. 31,573

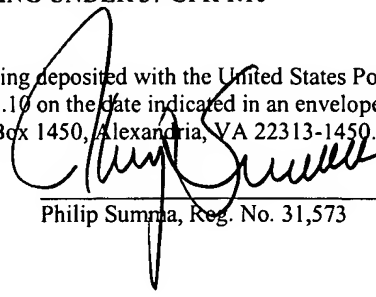
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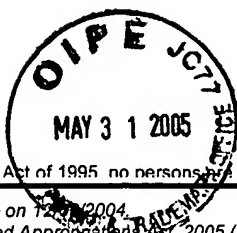
**CERTIFICATE OF MAILING UNDER 37 CFR 1.10**

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May 31, 2005

  
Philip Summa, Reg. No. 31,573



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Effective on 12/1/2004.  
Fees pursuant to the Consolidated Appropriations Act, 2005 (H.R. 4818).**FEE TRANSMITTAL**  
**For FY 2005**☐ Applicant claims small entity status. See 37 CFR 1.27**TOTAL AMOUNT OF PAYMENT** (\$) 500.00**Complete if Known**

Application Number	10/065,436
Filing Date	10/17/2002
First Named Inventor	Frederick L. Travelute, III
Examiner Name	Jennifer A. Boyd
Art Unit	1771
Attorney Docket No.	3000.166

**METHOD OF PAYMENT** (check all that apply)☐ Check ☒ Credit Card ☐ Money Order ☐ None ☐ Other (please identify): \_\_\_\_\_☒ Deposit Account Deposit Account Number: 50-0332 Deposit Account Name: Summa & Allan, P. A.

For the above-identified deposit account, the Director is hereby authorized to: (check all that apply)

☐ Charge fee(s) indicated below☐ Charge fee(s) indicated below, except for the filing fee☒ Charge any additional fee(s) or underpayments of fee(s)  
under 37 CFR 1.16 and 1.17☐ Credit any overpayments**WARNING:** Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.**FEE CALCULATION****1. BASIC FILING, SEARCH, AND EXAMINATION FEES**

Application Type	FILING FEES		SEARCH FEES		EXAMINATION FEES		Fees Paid (\$)
	Fee (\$)	Small Entity Fee (\$)	Fee (\$)	Small Entity Fee (\$)	Fee (\$)	Small Entity Fee (\$)	
Utility	300	150	500	250	200	100	
Design	200	100	100	50	130	65	
Plant	200	100	300	150	160	80	
Reissue	300	150	500	250	600	300	
Provisional	200	100	0	0	0	0	

**2. EXCESS CLAIM FEES**

Fee Description	Fee (\$)	Small Entity Fee (\$)
Each claim over 20 (including Reissues)	50	25
Each independent claim over 3 (including Reissues)	200	100
Multiple dependent claims	360	180
<b>Total Claims</b>		
- 20 or HP = _____ x _____ = _____		
HP = highest number of total claims paid for, if greater than 20.		
<b>Indep. Claims</b>		
- 3 or HP = _____ x _____ = _____		
HP = highest number of independent claims paid for, if greater than 3.		

**3. APPLICATION SIZE FEE**

If the specification and drawings exceed 100 sheets of paper (excluding electronically filed sequence or computer listings under 37 CFR 1.52(e)), the application size fee due is \$250 (\$125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).

Total Sheets	Extra Sheets	Number of each additional 50 or fraction thereof	Fee (\$)	Fee Paid (\$)
_____ - 100 = _____	_____ / 50 = _____	(round up to a whole number) x _____		

**4. OTHER FEE(S)**

Non-English Specification, \$130 fee (no small entity discount)

Other (e.g., late filing surcharge): Filing a Brief in Support of an Appeal under 37CFR 41.20(b)(2) \$500.00**SUBMITTED BY**

Signature		Registration No. 31,573 (Attorney/Agent)	Telephone 704-945-6703
Name (Print/Type)	Phillip Summa		Date 05/31/2005

This collection of information is required by 37 CFR 1.136. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 30 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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**APPEAL BRIEF**

On March 31, 2005, Applicant filed a Notice of Appeal from the Primary Examiner to the Board Of Patent Appeals and Interferences in accordance with 37 C.F.R. § 1.191. The Notice of Appeal was filed in response to the Final Office Action mailed December 1, 2004. In accordance with 37 C.F.R. § 1.192(a), Applicant timely submits this Appeal Brief.

**Real Party in Interest**

The real party in interest is Wellman, Inc., a corporation organized under the laws of South Carolina and located in Fort Mill, South Carolina ("Wellman"). Wellman is the real party in interest by virtue of an assignment from the inventor to Wellman submitted with the application and now recorded at Reel 013617, Frame 0427.

**Statement of Related Appeals and Interferences**

There are currently no related appeals or interferences.

### **Status of Claims**

Claims 2, 4-38, and 72-80 are pending and stand rejected. Claims 2, 4-38, and 72-80 are the subject of this appeal. Claims 39-71 and 81-86 have been withdrawn. Claims 1 and 3 have been cancelled. The claims are attached hereto as Exhibit 1.

### **Status of Amendments**

No amendments were entered subsequent to the Examiner's final rejection dated December 1, 2004.

### **Summary of Invention**

The claimed invention is related to materials useful for absorbing large amounts (relative to their own weight) of liquids and is particularly related to highly absorbent fibers that can be incorporated into absorbent structures for which fibers are desired or necessary, particularly structures that include nonwoven fabrics.

Such absorbing structures generally incorporate physically-absorbing elements or chemically absorbing elements, and often both. Currently, chemically-absorbing elements are frequently of the modified polyacrylate family and include sodium polyacrylate and related compounds. Such modified polyacrylate compositions can indeed absorb large amounts of liquids, typically hundreds of grams of water per gram of material. They cannot, however, be formed into fibers, and instead must be coated thereon whenever an absorbent fabric structure (typically, but not necessarily, nonwoven) is desired or required.

Although fibrous structures are available with highly absorbent characteristics, they tend to be combinations in which a highly absorbent material (*e.g.*, the polyacrylates) is physically or chemically attached to fibers or to a fabric. As a result, they tend to be somewhat sophisticated in nature, and are thus relatively expensive.

Conventional fibers offer the advantages of fabric manufacture, but cannot generally approach the absorbency of the modified polyacrylates. For example, cotton can typically absorb water in an amount of about 10-15% by volume, wool can absorb about 10-20%, and rayon about 15-20%.

Even these absorbencies can be disadvantageous, however, because many fibers tend to lose strength or other desired fiber (or fabric) characteristics when wet. Nylon, for example, tends to stretch when wet. In contrast, polyester remains generally unaffected by moisture, but has very little inherent absorbency. Although polyester is widely used in athletic clothing because of its high strength, its wicking (as opposed to absorbing) properties, and its "wash and wear" characteristics, its low absorbency has prevented its widespread use for absorbent purposes. Nevertheless, polyester is generally inexpensive, and widely available. Its properties are well-understood as are the techniques required to manufacture polyester filament, staple fiber from filament, and yarns and fabrics from the staple. To date, however, attempts at incorporating polyester into absorbent structures have tended to be chemically or physically complex; *e.g.*, U.S. Patent No. 4,361,617.

Accordingly, incorporating polyester into absorbent structures as a replacement for or complement to existing structures is an attractive possibility.

In this regard, the invention is a hollow polymeric filament having sufficient openings therein for said hollow filament to substantially fill with water. In one aspect, the invention is a polyester filament having a moisture absorption capability of between about 10 and 30 percent by volume. In another aspect, the invention is a hollow polyester filament having an asymmetric cross section and having sufficient openings therein for the hollow filament to substantially fill with water.

The claimed material eliminates or reduces many of the problems identified above with respect to synthetic, natural, and combined materials. Further, material according to the present invention is inexpensive and widely available.

### **The Issues**

The first issue is whether Claims 2, 4, 5, and 11-15 — which recite “consisting essentially of” language — are patentable over a 35 U.S.C. § 102(b) rejection when the § 102(b) reference requires additives that affect the basic and novel characteristics of the invention.

The second issue is whether Claims 2, 4-10, and 72-80 are patentable over a 35 U.S.C. § 102(b)/103(a) rejection when the reference cited by the Examiner teaches away from the claimed invention.

The third issue is whether Claims 16-38 are patentable over a 35 U.S.C. § 103(a) rejection when a required procedure taught by the references would destroy the claimed invention.

### **Grouping of the Claims**

The claims at issue, Claims 2, 4-38, and 72-80, do not stand or fall together for the purpose of this appeal. The claims are considered to be in five groups.

Group 1 includes Claims 2 and 4-15. Claim 2 is the representative claim for Group 1 and covers a hollow polyester filament consisting essentially of polyethylene terephthalate.

Group 2 includes Claims 16-27. Claim 16 is the representative claim for Group 2 and covers a polyester filament having a moisture absorption capability of between about 10 and 30 percent by volume.

Group 3 includes Claims 28-36. Claim 29 is the representative claim for Group 3 and covers a hollow filament having an asymmetrical cross section.

Group 4 includes Claims 37 and 38. Claim 37 is the representative claim for Group 4 and covers a hollow staple fiber consisting essentially of polyethylene terephthalate.

Group 5 includes Claims 72-80. Claim 72 is the representative claim for Group 5 and covers a staple filament having a coaxial opening entirely therethrough.

#### **The Office's Rejection**

The Office rejects pending Claims 2, 4, 5, and 11-15 under 35 U.S.C. § 102(b) as anticipated by U.S. Patent No. 4,336,307 to Shiozaki *et al.* The Examiner speculates that because the Shiozaki '307 patent discloses a number of fine pores through which the hollow is connected with the outside of the filament, the pores are "sufficient openings" to fill with liquid. *See* June 28, 2004 Office Action, paragraph 7.

The Office rejects pending Claims 2, 4-10, and 72-80 under 35 U.S.C. § 102(b)/103(a) as anticipated by, or in the alternative, obvious over JP 57139600A (Hirakawa *et al.*). The Examiner maintains that the Hirakawa '600A reference inherently discloses the claimed invention by disclosing the use of "...like materials (i.e. a polyester staple filament having a length between 1-15 mm and a denier of up to 3)." *See* June 28, 2004 Office Action, paragraph 9.

The Office rejects pending Claims 16-38 under 35 U.S.C. § 103(a) as obvious over JP H3-287848 (Tamiya *et al.*) in view of U.S. Patent No. 6,368,990 to Jennergren *et al.* The Examiner maintains that the combination renders obvious the claimed invention despite the lack of any functional absorption capacity disclosure, as claimed. In addition, both references teach a thermal bonding step melting two kinds of polymer together to

form a conjugate. *See* June 28, 2004 Office Action, paragraph 11. This teaching — if applied to the claimed invention — will destroy the claimed absorptive function.

**The Office has Failed to Provide an Anticipatory Reference**

The Examiner rejected Claims 2, 4, 5 and 11-15 under 35 U.S.C. §102(b) as anticipated by U.S. Pat. No. 4,336,307 to Shiozaki *et al.* The Examiner contends that there is no evidence to support the Applicants' argument that the pore forming agent required by Shiozaki materially affects the basic and novel characteristics of the filament. Further, the Examiner states that, "If the basic and novel characteristics of the Applicant's invention is the ability to fill with a liquid, nothing added by Shiozaki impairs that characteristic."

Applicants respectfully contend that the, "basic and novel characteristic" of the invention is not simply, "...the ability to fill with a liquid. ..." The basic and novel characteristics of the invention are defined by the four corners of the claim. *See* MPEP 2163 (II)(A)(1). Thus, the Examiner's initial reasoning is flawed.

Furthermore, the Examiner is attempting to take the position that polyethylene terephthalate is identical to polyester blended with the R'SO<sub>3</sub>M' sulfonate (R' = 3-30 carbon alkali radicals; M' = alkali or alkali earth metal). The Examiner maintains this position even though the sulfonate is included for the specific purpose of being treated — along with the polyester — with an alkali solution. According to Shiozaki this, "partially dissolves" the polyester and modifies its hand and appearance (See Column 9, lines 55-64).

In short, an alkali-treated blend of polyester and sulfonate cannot, "consist essentially of," polyethylene terephthalate. Accordingly, Shiozaki must be removed as a §102 reference.



**The Office has Failed to Establish a §102/103 Rejection**

The Examiner has also raised publication JPS57-139600A (Hirakawa, *et. al.*) as a “35 U.S.C. §102/103” reference against Claims 2, 4-10, and 72-80. First, with respect to §102, the ‘600A publication merely mentions that its paper-like sheet material can contain, “empty-core fibers.” The mere recitation of an, “empty core,” fails to meet the recitations of Claims 2 and 72. As noted in Applicants’ specification, mere hollow filaments will not, “substantially fill” or, “fill entirely” with water or related liquids because the presence of air trapped in the hollow core will quickly balance (and stop) the capillary effect before the filament will fill. *See* paragraph 0039.

Accordingly, the “empty core fiber” structure disclosed by the ‘600A publication fails to anticipate Claims 2 and 72. Therefore, the ‘600A publication must be removed as a 35 U.S.C. §102 reference as against the pending claims.

With respect to the 35 U.S.C. §103(a) rejection, the Examiner further rejected Claims 2, 4-10, and 72-80 under as obvious over the ‘600A reference.

The ‘600A publication discloses, “...a non-woven fiber sheet having flexible and excellent texture and appearance and is used for products, such as hygiene products.” *See* page 655, column 2, section 3, first paragraph. Furthermore, the ‘600A publication discloses that, “The inventors of the present invention ... succeeded in manufacturing extremely flexible and soft-to-the-touch non-woven fiber sheets. ...” *See* page 656, column 1, second paragraph. Yet further disclosure states that,

“The nonwoven fiber sheet made by the method of the present invention has excellent flexibility and bulkiness in addition to its favorable texture. For this reason, the fiber sheet can be used as a top sheet for diapers and sanitary pads, other hygiene products. ...”

*See* page 657, column 1, paragraph 3.

Conspicuously absent from the list of features in the '600A publication is the ability of the fiber to, "substantially fill" or to, "fill entirely" with a liquid as claimed in Claims 2 and 72 of the invention, respectively. In fact, the '600A publication teaches away from the invention by grouping that fiber with, "hydrophobic polyester fibers ... used as the top sheet for hygiene products, such a diapers and sanitary pads, in particular." By definition, "hydrophobic" means, "Repelling, tending not to combine with, or incapable of dissolving in water." *See, "The American Heritage Dictionary of the English Language, Fourth Edition."*

Interpreted by one of ordinary skill in the art, the disclosure of the '600A publication is a hydrophobic fiber sheet suitable for use as a top sheet in hygiene and other products. This hydrophobic fiber sheet possesses a pleasing hand and is permeable (not absorbent) to moisture. *See* page 656, column 1, paragraph 1. The hydrophobic sheet is permeable to allow moisture through the hydrophobic sheet to an absorbent layer, as is typical of sanitary product construction. It is not designed to fill with moisture in any capacity. Accordingly, no moisture absorption characteristics regarding the hydrophobic fiber disclosed in the '600A publication is given.

As for the '600A publication disclosing empty-core fibers; this disclosure is specifically in the context of improving the flexibility and bulkiness properties of the hydrophobic fiber sheet. Accordingly, the '600A publication includes several embodiments of non-circular cross section fibers to this end. *See* the paragraph bridging pages 656 and 657. This disclosure is not relevant in the context of the claimed invention.

In summary, the '600A publication fails to suggest a filament or a staple filament capable of substantially filling or filling entirely with liquid. Furthermore, the '600A publication discloses a fiber sheet in the context of a hydrophobic polyester fiber, meaning that the sheet repels or tends not to combine with water. Thus, Claims 2, 4-10,

and 72-80 are not rendered obvious by the '600A publication. Therefore, the '600A publication fails as a 35 U.S.C. § 103(a) reference as well.

**The Office has Failed to Establish a Prima Facie Case of Obviousness**

The Examiner rejected Claims 16-38 under 35 U.S.C. §103(a) as being unpatentable over JP H3-287848 to Tamiya *et al.* in view of U.S. Pat. No. 6,368,990 to Jennergren *et al.*

Applicant respectfully submits that the combination cited by the Office fails to satisfy the requirements for a *prima facie* case of obviousness under *Graham v. John Deere*, 383 U.S. 1, 148 USPQ 459 (1966) and its progeny. Obviousness cannot be established by combining pieces of prior art absent some teaching, suggestion, or incentive supporting the combination. *In re Geiger*, 815 F.2d 686, 688, 1 USPQ2d 1276, 1278 (Fed. Cir. 1987) (reversing the finding of obviousness because the standard for obviousness was not met where the application was based on a specific combination of existing techniques where many possible combinations existed).

The independent claims in this group (Claims 16, 28, 29, 30, and 37) all recite specific absorption capacities in clear functional terms. Neither the Tamiya '848 reference nor the Jennergren '990 patent, taken alone or together, disclose or suggest these functional capacities.

The Tamiya '848 reference discloses a fiber conjugate comprising two kinds of polymer having a specific melting point therebetween. Similarly, the Jennergren '990 patent discloses nonwoven fabrics formed of hollow filaments and/or staple fibers formed of a polypropylene composition. The Jennergren reference further discloses that the hollow filaments of the '990 patent are, "...believed to form stronger thermal bonds (in the fabric and in laminate structures)...." Regarding thermal bonds, the Jennergren '990 patent also states that, "The thermal bonds can also have a greater bond area. ... This can also improve fabric strength and abrasion resistance." See column 3, lines 33 to 39.

With respect to independent Claims 16, 29, and 30, the thermal bonding step required by both Tamiya and Jennergren — especially over a large area of the filament — would destroy the absorptive capability of the instant invention by obliterating the sufficient openings that allow the substantial filling with water. Claims 16, 29, and 30 are supported in the specification with the teaching of openings that allow liquid to substantially or entirely displace air (or gas) via the principle of capillary action. *See* paragraphs 0039 to 0048. Thus, in light of the requirement by the cited references to melt filaments together, Applicants respectfully submit that Claims 16-38 are not obviated by references that destroy some or all of the absorptive capability of the instant invention (*i.e.*, a thermal bonding step).

Regarding Claims 16 and 28, both references are silent with respect to an absorption capability range despite a plethora of other measurements. *See* Tables 1, 2, and 3 of the '990 patent and Table 1 of the Tamiya '848 publication. Therefore, Applicants submit that any absorptive capability of the melted filaments disclosed in the references is unknown. Thus, the Examiner's assertion that the cited references inherently disclose the claimed absorption capability is unfounded.

Independent Claims 28 and 37 are written using the "consisting essentially of" language. Applicants respectfully submit that the thermal bonding processes required by Tamiya and Jennergren would necessarily melt at least a portion of the filament or fiber. The melting step will destroy the pores of the invention by melting them closed. This constitutes a material change that would alter the claimed moisture absorption capability.

In this regard, Applicants respectfully point out that the, "consisting essentially of" language concerns whether, "...introduction of additional steps or components would materially change the characteristics of applicant's invention" and does not concern anything that "impairs" the basic and novel characteristic of the filament. *See* MPEP 2111.03. That said, both references further disclose materials that materially affect the basic and novel characteristics of the claimed invention.

For example, the Tamiya '848 reference discloses a conjugate fiber comprising a core part and a sheath part. Although the core part may be formed of polyethylene terephthalate, the '848 publication also discloses that the sheath completely surrounds and is bonded (*i.e.*, melted) to the core part. *See* page 322, first column. Applying the sheath material to the instant invention will materially affect its basic and novel characteristics. Thus, the combination of the Jennergren '990 patent and the Tamiya '848 publication fails as applied to the instant invention.

Applicant asserts that there is no suggestion or motivation to combine the conjugate fibers of the cited references in the manner described by the Office. In addition, the combination would destroy the instant invention.

### **Conclusion**

The Shiozaki '307 patent fails as a §102 reference because it fails to disclose a hollow polyester filament or a hollow staple fiber consisting essentially of polyethylene terephthalate and having sufficient openings therein for the filament or fiber to substantially fill with a liquid, such as water. Instead, the Shiozaki '307 patent teaches the inclusion of a sulfonate additive that "partially dissolves" the polyester when treated with an alkali solution. The sulfonate addition constitutes a material change that affects the basic and novel characteristics of the claimed invention.

The Hirakawa '600A publication fails as a §102/103 reference because it fails to recite a hollow polyester filament or a staple filament that may be substantially filled or filled entirely with liquid. Instead, the Hirakawa '600A publication discloses, "empty core fibers" used to obtain a hydrophobic sheet, "...having a nice soft texture as well as high levels of permeability and uniformity." In addition, the hydrophobic nature of the sheet described in the '600A publication teaches away from the claimed invention.

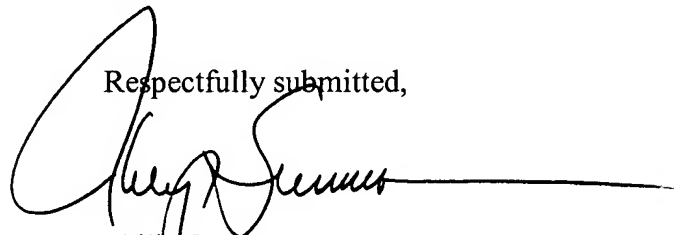
The combination of the Tamiya '848 reference with the Jennergren '990 patent fails to establish a *prima facie* case of obviousness as applied to the instant invention.

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Both references fail to teach or suggest functional absorption capacities despite painstaking detail with respect to other measurements. In addition, both references disclose conjugate fibers. The conjugate fibers are formed in such a way as to destroy the absorptive capability of the claimed invention. Thus, no motivation exists to combine the references in the manner suggested by the Office and the rejection must be overturned.

Respectfully submitted,



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**Exhibit 1**

1. (Cancelled)
2. (Previously Presented) A hollow polyester filament consisting essentially of polyethylene terephthalate having sufficient openings therein for said hollow filament to substantially fill with a liquid selected from the group consisting of water, water-based solutions, and water-based suspensions.
3. (Cancelled)
4. (Previously Presented) A staple fiber cut from the hollow filament of Claim 2.
5. (Original) A staple fiber according to Claim 4 and having a length sufficient to exhibit fiber properties.
6. (Original) A staple fiber according to Claim 4 and having a length sufficient to support a meniscus of water at each end thereof.
7. (Original) A staple fiber according to Claim 4 having a length of between about one-quarter inch and two inches.
8. (Original) A nonwoven fabric formed from a plurality of staple fibers according to Claim 4.
9. (Original) A nonwoven fabric formed from a plurality of staple fibers according to Claim 7.

10. (Original) An absorbent structure that includes a nonwoven fabric according to Claim 9.

11. (Previously Presented) A hollow filament according to Claim 2 wherein both said filament and its hollow portion have respective circular cross section.

12. (Previously Presented) A hollow filament according to Claim 2 wherein said filament has a circular cross section and said hollow portion has a non-circular cross section.

13. (Previously Presented) A hollow filament according to Claim 2 wherein said filament has a non-circular cross section and said hollow portion has a circular cross section.

14. (Previously Presented) A hollow filament according to Claim 2 wherein said filament has a non-circular cross section and said hollow portion has a non-circular cross section.

15. (Original) A hollow staple fiber consisting essentially of polyethylene terephthalate and having sufficient openings therein for said staple fiber to substantially fill with water.

16. (Original) A polyester filament having a moisture absorption capability of between about 10 and 30 percent by volume.

17. (Original) A filament according to Claim 16 consisting essentially of polyethylene terephthalate.



18. (Original) A hollow filament according to Claim 16.
19. (Original) A hollow filament according to Claim 16 wherein both said filament and its hollow portion have respective circular cross section.
20. (Original) A staple fiber cut from the filament of Claim 16.
21. (Original) A nonwoven fabric formed from the staple fiber of Claim 20.
22. (Original) An absorbent structure that includes a nonwoven fabric according to Claim 21.
23. (Original) A hollow filament according to Claim 18 and having an asymmetric cross section.
24. (Original) A hollow filament according to Claim 23 wherein both said filament and its hollow portion have respective circular cross section and said hollow portion is not coaxial with said filament..
25. (Original) A staple fiber cut from the filament of Claim 23.
26. (Original) A nonwoven fabric formed from the staple fiber of Claim 25.
27. (Original) An absorbent structure that includes a nonwoven fabric according to Claim 26.

28. (Original) A staple fiber consisting essentially of polyethylene terephthalate and having a moisture absorption capability of between about 10 and 30 percent by volume.

29. (Original) A hollow filament having an asymmetric cross section and having sufficient openings therein for said hollow filament to substantially fill with liquid.

30. (Original) A hollow polyester filament having an asymmetric cross section and having sufficient openings therein for said hollow filament to substantially fill with a liquid selected from the group consisting of water, water-based solutions, and water-based suspensions.

31. (Original) A filament according to Claim 29 consisting essentially of polyethylene terephthalate.

32. (Original) A filament according to Claim 29 wherein both said filament and its hollow portion have respective circular cross sections and wherein said hollow portion is not coaxial with said filament.

33. (Original) A staple fiber cut from the filament of Claim 29.

34. (Original) A staple fiber according to Claim 33 having a length of between about one-quarter inch and two inches.

35. (Original) A nonwoven fabric formed from a plurality of staple fibers according to Claim 34.

36. (Original) An absorbent structure that includes a nonwoven fabric according to Claim 35.

37. (Original) A hollow staple fiber consisting essentially of polyethylene terephthalate;

said staple fiber having sufficient openings therein for said staple fiber to substantially fill with a liquid; and

said staple fiber and its hollow portion having respective circular cross sections and wherein said hollow portion is not coaxial with said staple fiber.

38. (Original) A hollow staple fiber according to Claim 37 having sufficient openings therein for said staple fiber to substantially fill with a liquid selected from the group consisting of water, water-based solutions, and water-based suspensions.

39. (Withdrawn) A method of forming a highly water-absorbent polyester filament, the method comprising:

contacting a hollow polyester filament with a chemical composition in an amount and for a time sufficient to attack the hollow filament and create sufficient openings therein for the hollow filament to substantially fill with a liquid while less than an amount that would completely open or dissolve the filament.

40. (Withdrawn) A method according to Claim 39 comprising creating sufficient openings for the hollow filament to substantially fill with a liquid selected from the group consisting of water, water-based solutions, and water-based suspensions.

41. (Withdrawn) A method according to Claim 39 comprising contacting the filament with an aqueous alkali solution.

42. (Withdrawn) A method according to Claim 41 comprising contacting the filament with the aqueous alkali solution at an elevated temperature.

43. (Withdrawn) A method according to Claim 41 comprising contacting the filament with an aqueous solution selected from the group consisting of sodium hydroxide, potassium hydroxide and ammonium hydroxide.

44. (Withdrawn) A method according to Claim 39 comprising contacting the filament with an organic solvent for polyester.

45. (Withdrawn) A method according to Claim 39 comprising contacting the filament with a solvent selected from the group consisting of: benzene, esters and ketones.

46. (Withdrawn) A method according to Claim 39 comprising contacting the filament with a plasticizer.

47. (Withdrawn) A method according to Claim 39 comprising contacting a polyethylene terephthalate filament.

48. (Withdrawn) A method according to Claim 39 and further comprising the step(s) of spinning the hollow filament from a melt prior to the step of contacting the filament with the attacking composition.

49. (Withdrawn) A method according to Claim 48 comprising spinning a hollow filament with an asymmetric cross section.

50. (Withdrawn) A method according to Claim 39 and further comprising cutting the filament into staple fibers.

51. (Withdrawn) A method according to Claim 50 and further comprising forming a nonwoven fabric from the cut staple fibers.

52. (Withdrawn) A method according to Claim 41 and further comprising neutralizing the filament after contacting the filament with the aqueous alkali solution.

53. (Withdrawn) A method according to Claim 39 and further comprising the steps of:

- heat setting the filament;
- cutting the filament into staple fibers; and
- baling the cut staple fibers;

all following the step of contacting the filament with the chemical composition.

54. (Withdrawn) A method of forming a highly absorbent synthetic polymer filament, the method comprising:

- contacting a hollow polymeric filament with an organic solvent for the polymer in an amount and for a time sufficient to attack the hollow filament and create sufficient openings therein for the hollow filament to substantially fill with a liquid while less than an amount that would completely open or dissolve the filament.

55. (Withdrawn) A method according to Claim 54 comprising creating sufficient openings for the hollow filament to substantially fill with a liquid selected from the group consisting of water, water-based solutions, and water-based suspensions

56. (Withdrawn) A method according to Claim 54 comprising contacting a hollow polyester filament with the solvent.

57. (Withdrawn) A method of forming a highly absorbent synthetic polymer filament, the method comprising:

mechanically cracking a hollow polymeric filament until the filament is sufficiently open to substantially fill with a liquid.

58. (Withdrawn) A method according to Claim 57 comprising mechanically cracking a hollow polyester filament until the filament is sufficiently open to substantially fill with a liquid selected from the group consisting of water, water-based solutions, and water-based suspensions.

59. (Withdrawn) A method according to Claim 57 comprising cracking a filament that has a asymmetric cross section.

60. (Withdrawn) A method according to Claim 59 and further comprising the step of spinning the asymmetric filament from a melt prior to the step of mechanically cracking the filament.

61. (Withdrawn) A method according to Claim 59 and further comprising cutting the filament into staple fiber.

62. (Withdrawn) A method according to Claim 61 and further comprising forming a nonwoven fabric from the staple fibers.

63. (Withdrawn) A method according to Claim 59 and further comprising the step of spinning the asymmetric filament prior to the step of mechanically cracking the filament.

64. (Withdrawn) A method according to Claim 57 and further comprising spinning the hollow filament from a melt prior to the step of cracking the filament.

65. (Withdrawn) A method according to Claim 64 and further comprising cutting the filament into staple fiber.

66. (Withdrawn) A method according to Claim 65 and further comprising forming a nonwoven fabric from the staple fibers.

67. (Withdrawn) A method according to Claim 57 comprising cracking a filament consisting essentially of polyethylene terephthalate.

68. (Withdrawn) A method according to Claim 57 and further comprising the steps of heat setting the filaments;  
cutting the filaments into staple fiber; and  
baling the cut staple fibers.

69. (Withdrawn) A method of forming a highly absorbent polyester filament, the method comprising:  
spinning an asymmetric hollow filament from a melt;  
preferentially quenching the filament to create greater and lesser degrees of polymer orientation along the filament;  
drawing the filament to a desired draw ratio;  
heat setting the drawn filament; and

mechanically cracking a hollow polyester filament until the filament is sufficiently open to substantially fill with a liquid.

70. (Withdrawn) A method according to Claim 69 comprising mechanically cracking the filament until the filament is sufficiently open to substantially fill with a liquid selected from the group consisting of water, water-based solutions, and water-based suspensions.

71. (Withdrawn) A method according to Claim 69 wherein the drawing step comprises drawing the filament to degree that highly stresses the more highly oriented portions of the filament.

72. (Original) A staple filament having a coaxial opening entirely therethrough, the filament having a length defined by the minimum length sufficient to support a meniscus of water in the coaxial opening and a maximum length at which the filament will fill entirely with a liquid selected from the group consisting of water and water-based solutions and suspensions.

73. (Original) A staple filament according to Claim 72 wherein the maximum length is the length above which air pressure between a meniscus at each end of the filament will prevent the opening from filling entirely with the selected liquid.

74. (Original) A staple filament according to Claim 72 comprising polyester.

75. (Original) A staple filament according to Claim 72 comprising polyethylene terephthalate.

76. (Original) A staple filament according to Claim 72 having a length less than about one-half inch.



77. (Original) A staple filament according to Claim 72 having a length of about one-quarter inch.

78. (Original) A staple filament according to Claim 72 having a denier of between about 1 and 45.

79. (Original) A staple filament according to Claim 72 having a denier of between about 1 and 10.

80. (Original) A staple filament according to Claim 72 having a denier of between about 1 and 3.

81. (Withdrawn) A method of forming a highly absorbent filament comprising:  
spinning a hollow filament at a denier of between about 1 and 45;  
quenching the filament; and  
cutting the filament into short staple fibers having a length defined by the minimum length sufficient to support a meniscus of water in the coaxial opening and a maximum length at which the filament will fill entirely with a liquid selected from the group consisting of water and water-based solutions and suspensions.

82. (Withdrawn) A method according to Claim 81 comprising spinning a polyester hollow filament.

83. (Withdrawn) A method according to Claim 81 comprising spinning the filament to a denier of between about 1 and 10.

84. (Withdrawn) A method according to Claim 81 comprising spinning the filament to a denier of between about 1 and 3.

85. (Withdrawn) A method according to Claim 81 comprising cutting the filament into staple less than about one-half inch in length.

86. (Withdrawn) A method according to Claim 81 comprising cutting the filament into staple about one-quarter inch in length.